CLAIMS

1. A composition comprising a virulent or opportunistic prokaryote in which metal ion-dependent gene regulation confers a growth or an infectious advantage, said prokaryote containing a recombinant DNA molecule comprising a promoter in operable association with a sequence encoding a dominant, metal ion-independent repressor protein or a partially metal ion independent repressor protein, and a carrier.

2. The composition of claim 1 wherein said recombinant DNA molecule is contained in a non-chromosomal vector.

3. The composition of claim 1 wherein said prokaryote is a bacterium.

4. The composition of claim 3 wherein said bacterium is a member of the genus *Mycobacterium*.

5. The composition of claim 4 wherein said bacterium is *Mycobacterium tuberculosis*.

6. The composition of claim 4 wherein said bacterium is *Mycobacterium leprae*.

7. The composition of claim 4 wherein said bacterium is *Mycobacterium avium*.

8. The composition of claim 4 wherein said bacterium is *Mycobacterium paratuberculosis*.

9. The composition of claim 4 wherein said bacterium is *Mycobacterium bovis*.

10. The composition of claim 3 wherein said bacterium is a member of the genus *Staphylococcus*.

11. The composition of claim 10 wherein said bacterium is *Staphylococcus epidermitis*.

12. The composition of claim 10 wherein said bacterium is *Staphylococcus aureus*.

13. The composition of claim 3 wherein said bacterium is a member of the genus *Streptococcus*.

14. The composition of claim 13 wherein said bacterium is *Streptococcus mutans*.

15. The composition of claim 13 wherein said bacterium is *Streptococcus pneumoniae*.

16. The composition of claim 1 wherein said sequence encodes a metal ion-independent diphtheria toxin repressor (DtxR) protein.

17. The composition of claim 1 wherein said sequence encodes a metal ion-independent or a partially metal ion independent IdeR or SirR repressor protein.

18. The composition of claim 3 wherein said bacterium is a gram-positive bacterium.

19. A composition comprising a virulent or opportunistic bacterium in which metal ion-dependent gene regulation confers a growth or an infectious advantage, said bacterium containing a recombinant DNA molecule comprising a promoter in operable association with

a sequence encoding a metal or metal ion-independent DtxR protein or a partially metal ion independent DtxR protein, and a carrier.

20. An isolated and purified DNA molecule consisting essentially of a sequence encoding a metal ion independent or a partially metal ion independent DtxR or homologue thereof.

21. The DNA molecule of claim 20 wherein said DtxR homolog is IdeR.

22. The DNA molecule of claim 20 wherein said DtxR homolog is SirR.

23. A recombinant DNA molecule containing a constitutive promoter element in operable association with the DNA molecule of claim 20.

24. A recombinant vector comprising a promoter element in operable association with the DNA molecule of claim 20.

25. The recombinant vector of claim 24 which is a plasmid.

26. A virulent or opportunistic prokaryote in which metal ion-dependent gene regulation confers a growth or an infectious advantage, wherein said prokaryote is transformed with a DNA molecule encoding a dominant, metal ion-independent repressor protein or a partially metal ion-independent repressor protein, and wherein said DNA molecule is expressed in said prokaryote.

27. A method of enhancing protective immunity against infection or disease caused by an opportunistic or virulent prokaryotic pathogen in which metal ion-dependent gene regulation confers a growth or an infectious advantage, comprising administering to an animal the composition of claim 1.

28. The method of claim 27 wherein said animal is a human.

29. The method of claim 27 wherein the prokaryote is in live form.

30. The method of claim 27 wherein the prokaryote is in inactivated form.

31. A method of attenuating or reducing the severity of an infection or disease caused by an opportunistic or virulent prokaryotic pathogen in which metal ion-dependent gene regulation confers a growth or an infectious advantage, comprising administering to an animal the composition of claim 1.

32. The method of claim 1 wherein said animal is a human.